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### Remarks/Arguments

Claims 1-8 are active in this application. Applicants respectfully request additional consideration and review in view of the following remarks.

#### In the Drawings

The Examiner has objected to the drawings under 37 CFR 1.83(a) as not showing every feature of the invention specified in the claims. Specifically, the Examiner noted that the feature "said coupling section comprises a photodiode" in claim 8 is not shown in the drawings.

Applicants respectfully submit that the photodiode of the coupling section is shown in Fig.4(f), and is discussed in the specification in paragraphs 0021 and 0026. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection to the drawings.

#### Double Patenting

The Examiner has provisionally rejected Claim 1 under the judicially created doctrine of obvious-type double patenting as being unpatentable over claims 1-21 of copending Application No. 09/871,393 (Leuthold 7). The Examiner notes that "Although the conflicting claims are not identical, they are not patentably distinct from each other because the limitation recited in claims 1-8 of the instant application are encompassed by claims 1-21 of copending Application No. 09/871,393 (Leuthold)." This rejection is respectfully traversed.

Applicants submit that present application and Leuthold 7 are directed to two patentably distinct inventions. Specifically, claims 1-8 of the present application are directed to a method for 3R (reamplification, reshaping, *retiming*) regeneration using a clock signal  $P_{clk}$  to provide the additional retiming feature.

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Claim 1 includes the specific step (not taught or suggested in Leuthold 7) of "generating a phase and amplitude encoded clock signal from at least one input optical signal". The additional retiming capability provided by using  $P_{clk}$  is important for high-speed systems, where timing jitter becomes a major issue. The physics exploited in the claimed methods of the present invention are based on cross-phase and cross-gain modulation.

In sharp contrast, the methods and apparatus for all-optical wavelength conversion and regeneration disclosed and claimed in Leuthold 7 are based on entirely different physical effects. Leuthold 7 describes wavelength conversion and 2R (reamplification, reshaping) regeneration *using a carrier signal  $P_{cw}$  (i.e. a continuous wave light signal as defined in the detailed description of Leuthold 7).*

The 2R scheme of Leuthold 7 is important for lower speed transmission systems and provides a cost effective solution that only requires a continuous wave  $P_{cw}$  source. The underlying physics is purely based on cross-phase modulation encoding (as can be understood by those skilled in the art from the detailed description).

In view of the foregoing, Applicants submit that none of the pending claims are rendered obvious by the disclosure of Leuthold 7 and respectfully request withdrawal of the provisional obviousness-type double patenting rejection of claim 1.

### 35 U.S.C. §102

Claims 1 and 3 have been rejected under 35 U.S.C. §102(e) as being anticipated by Joyner et al, US Patent No. 6,437,905 (Joyner). This rejection is respectfully traversed.

In paragraph 5, the Examiner states with reference to Fig. 1 of Joyner, that Joyner discloses a method of optical signal regeneration comprising the steps of: *generating a phase and amplitude clock signal from at least an input optical signal.*

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Applicants respectfully submit that Joyner nowhere teaches or suggests such a method. Specifically, Joyner discloses a wavelength converter that converts and reshapes a pulsed input signal  $P_{in}$  at  $\lambda_1$  into a wavelength converted signal  $P_{conv}$  at  $\lambda_2$ . The pulsed input signal  $P_{in}$  modulates the phase and the gain of copropagating CW signal  $P_{cw}$  in an SOA. See Joyner, col. 2, lines 25-28.

Joyner does not teach or suggest the use of a clock signal for 3R regeneration (including retiming), and specifically does not disclose a method including the step of *"generating a phase and amplitude clock signal..."* of claim 1 (and of claim 3, which depends therefrom).

Accordingly, Applicants submit that none of the claims of the present application are anticipated by Joyner, and respectfully request withdrawal of the rejection of claims 1 and 3 over Joyner.

Claims 1, 3, 7 and 8 have been rejected under 35 U.S.C. 102(e) as being anticipated by Roberts et al, US Patent No. 6,229,633 (Roberts). This rejection is respectfully traversed.

As discussed above, the claims of the present invention are directed to a method comprising, in pertinent part, *...generating a phase and amplitude encoded clock signal... and introducing the encoded clock signal into a delay interference section such that an amplitude modulated clock signal is produced.* As can be understood by those skilled in the art, the delay interference section is a passive device which is a relatively simple, inexpensive, and effective device.

Roberts, however, discloses a method and apparatus for modulating a pulse train using an interferometer, in which the pulse train is fed into the interferometer and a data stream is fed into an optically active section in one arm of the interferometer to cause the pulse train to be modulated.

Applicants note that the inclusion of an active section in the interferometer device as proposed by Roberts, produces a more complex and costly design that may suffer from significant signal amplitude gain or loss. Nowhere does Roberts

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teach or suggest *generating a phase and amplitude encoded clock signal* and *introducing* such a signal into a delay interference section as claimed in claims 1-8 of the present application.

Accordingly, Applicants submit that none of the claims of the present application are anticipated by Roberts, and respectfully request withdrawal of the rejection of claims 1, 3, 7 and 8 over Roberts.

35 U.S.C. §103

Claim 4 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Roberts in view of Cho et al, US Patent No. 6,335,819, (Cho). This rejection is respectfully traversed.

Applicants submit that, as discussed above, Roberts fails to teach or suggest the method of claim 1 and/or claim 2. Applicants further submit that Cho does not make up for the deficiencies of Roberts, and thus does not render claim 4 obvious, alone or in combination with Roberts. Accordingly, for at least these reasons, Applicants respectfully request withdrawal of the rejection of claim 4 under §103(a).

Objection to Claims 2, 5 and 6 / Allowable Subject Matter

Applicants note with appreciation the Examiners comments with regard to the allowability of claims 2, 5 and 6. In view of the arguments above regarding the allowability of claim 1, Applicants request reconsideration and allowance of claims 2, 5 and 6 which depend directly or indirectly from claim 1.

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Conclusion

In view of the foregoing remarks, it is submitted that claims 1-8 are in condition for allowance. Early notification of allowability is therefore earnestly solicited.

If there are any outstanding issues which the Examiner feels may be resolved by way of a telephone conference, the Examiner is cordially invited to contact the undersigned to resolve the issues.

Respectfully,

By 

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March 19, 2004

  
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